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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/506,602
Filing Date: September 10, 2004
Appellant(s): MIHAN ET AL.

MAILED
FEB 07 2008
GROUP 1700

Jacob A. Doughty
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed November 13, 2007, appealing from the Office action mailed August 13, 2007 (Non-Final Rejection after RCE).

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner.

Claims rejected under 35 U.S.C. §102(b) is withdrawn. However, claims rejected under 35 U.S.C. §103(a) remains in this Examiner's Answer.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

WO 00/58319	MAAS ET AL.	10-2000
6,844,290	MAAS ET AL.	1-2005

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

Claims 1-3 and 5-20 are rejected under 35 U.S.C. 103(a) as obvious over WO 00/58319 (hereinafter "WO '319).

WO '319 discloses a process for oligomerizing alpha-olefins, for example 1-butene, with a catalyst system obtained from: (a) a chromium compound CrX_3 and a ligand L that is derived from 1, 3, 5-triazacyclohexane, for example 1,3,5-tri-n-dodecyl-1,3,5-triazacyclohexane or from a compound CrX_3L ; and at least one activator additive containing an alkyl aluminum compound, for example triethylaluminum and ethyl aluminum dichloride, and a boron compound, for example trispentafluorophenylborane. The ratio of chromium compound to boron compound is between 1:0.1 and 1:10,000. See Abstract; page 1, lines 6-27; page 4, lines 35-44; page 8, line 37 to page 9, line 3 and page 9, lines 45-46; and page 12, lines 4-19 and lines 32-38. The reference also discloses chromium compounds including CrCl_3 (page 7, lines 5-16), molar ratio of triethylaluminum to ethylaluminum dichloride in the range of 1-50:1, preferably 3-20:1 (page 10, lines 1-2), and molar ratio of chromium to alkylaluminum compound in the range of 1:0.1-500 (page 9, lines 38-47). The oligomerization is conducted at a temperature ranging from 1 to 120° C, at a pressure ranging from 3 to 120 bar

(page 13, lines 5-10), and under inert gas such as nitrogen and argon (page 12, lines 45-47).

With respect to the claimed molar ratio of boron compound to chromium compound, the range disclosed by the reference overlaps the claimed range. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have determined the optimum molar ratio of boron compound to chromium compound to achieve most effective desired result.

With respect to the claimed molar ratio of chromium source to the alkylaluminum compound, the range disclosed by the reference appears to encompass the claimed range. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have determined the optimum molar ratio of chromium source to alkylaluminum compound to achieve most effective desired result.

(10) Response to Argument

NOTE: It is noted that the Appellants have relied upon U.S. Patent 6,844,290 which is the equivalent of WO 00/58319. The Examiner will, therefore, rely upon the same in responding to the arguments presented herein.

Appellants argue, "It is undisputed, however, that Maas does not disclose a catalyst including these particular components, in combination, as recited in claim 1." The Examiner disagrees because the catalytic components are expressly taught and, therefore, the combination is disclosed by Maas. Specifically, Maas discloses a catalyst obtainable from (a) a chromium compound (col. 1, lines 6-8), (b) a 1,3,5-triazacyclohexane ligand (col. 1, lines

12-13), and (c) at least one activating additive (col. 1, line 30). Maas, further, explicitly discloses 1,3,5-tri-n-dodecyl-1,3,5-triazacyclohexane as one of five **particularly preferred** 1,3,5-triazacyclohexanes (col. 3, lines 12-26; **emphasis** added by the Examiner). Maas, also, discloses only two combination of activating additives with one of the two being at least one boron compound and at least one aluminum alkyl (col. 7, lines 54-58).

Appellants argue, "The Examiner fails to demonstrate a reason why one of ordinary skill in the art would have been motivated to select the particular combination of components recited in claim 1." The argument is not persuasive because the motivation for selecting the particular combination is found in the reference itself. First, Maas' disclosure of a myriad of different 1,3,5-triazacyclohexane compounds would suggest to one of ordinary skill in the art that they are functionally equivalent. Second, contrary to Appellants' stance that there are "numerous preferred" compounds listed in the reference, Maas discloses **only five particularly preferred** 1,3,5-triazacyclohexane compounds, including the claimed 1,3,5-tri-n-dodecyl-1,3,5-triazacyclohexane (**emphasis** added by the Examiner). This is a very small group of a finite number of ligands from which to choose. Third, there are only two activating additives to select from one of which is the claimed boron compound. A simple calculation would show that there are only 10 possible combinations of catalyst including the claimed composition. Additionally, through routine experimentation one can easily arrive at the best combination from among the 10 possibilities. In light of the totality of the circumstances, Maas has disclosed the claimed catalyst

composition. *In re Petering*, 301 F.2d 676, 681, 133 USPQ 275, 280 (CCPA 1962). Moreover, Maas' disclosure of "preferred" 1,3,5-triazacyclohexane compounds would lead one skilled in the art to select from the preferred group because it would suggest that the preferred ligands have enhanced selectivity, enhanced catalytic activity, and longer catalyst life over other ligands.

Appellants argue, "more than mere hope to 'achieve desired results' would be required to prepare a catalyst including the particular combination of features recited in claimed 1 based on the disclosure of Maas." Based on Maas' disclosure as stated in the paragraph above, it is not just a mere hope to achieve desired results but there is a reasonable expectation of achieving success especially in light of Maas' preferred ligands which includes the claimed 1,3,5-tri-n-dodecyl-1,3,5,-triazacyclohexane.

Appellants argue, "The Examiner has given no weight to the rebuttal evidence set forth in the present specification." The Examiner respectfully disagrees with this argument. As stated in the Advisory Action mailed April 16, 2007, Comparative Example 4 is not deemed to be an objective evidence of improvement over the catalyst as recited in present claim 1 because Maas teaches various ligands including the claimed ligand. Stated in another way, Appellants have not compared with the closest catalyst disclosed by Maas. It should be noted that in col. 10, lines 9-10, Maas discloses "chromium complex 3": [(1,3,5-tri-n-dodecyl-1,3,5-triazacyclohexane)CrCl₃]. This is the same catalyst as recited in claim 1.

Also, in the same Advisory Action, the Examiner stated that the showing of superior results when B:Cr ratio is 10 over a B:Cr ratio of 2 does not commensurate in scope with the claim. Appellants claim a ratio of at least 5 and alpha-olefins having at least three carbon atoms. However, what the Appellants have shown is for a B:Cr ratio of 10 and butene only. Appellants have not shown (1) any results for when B:Cr ratio is 5 and for ratios greater than 10, and (2) that the catalyst would have the same success for all claimed alpha-olefins as for the demonstrated butene. Also, the claimed B:Cr molar ratio of at least 5 overlaps with the molar ratio of 0.1 to 1,000 as disclosed by Maas.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



In Suk Bullock/ib

Examiner, Art Unit 1797

Conferees:

Glenn Calderola



SPE, Art Unit 1797



Romulo Delmendo

Appeals Specialist, TC 1700